

PATENT SPECIFICATION (11)

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(21) Application No. 28427/75 (22) Filed 5 July 1975

(23) Complete Specification Filed 28 May 1976

(44) Complete Specification published 31 May 1979

(51) INT. CL.² B65H 23/28

(52) Index at acceptance B8R 8F4 RB2

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(19)



(54) "IMPROVEMENTS IN OR RELATING TO WEB FEEDING APPARATUS"

(71) We, SIMON CONTAINER MACHINERY LIMITED, a British Company, of Cheddle Heath, Stockport, Cheshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in any by the following statement:—

This invention concerns web feeding apparatus of the kind which can, for example, be disposed in a line of sheet handling machinery between a slitting machine for slitting a web longitudinally into a plurality of side-by-side parallel webs, and a rotary cutting machine for cross-cutting the slit webs into required lengths.

It is usual for a rotary cutting machine to have two or more pairs of rotary cutting cylinders between which the slit webs pass to be cut transversely, these pairs of cylinders being usually disposed at different heights in the machine. It therefore follows that apparatus for feeding the slit webs to the rotary cutting machine must provide for feeding of different webs to different vertical levels, and it is the object of the present invention to provide such an arrangement.

According to the present invention there is provided web feeding apparatus for directing a batch of webs of sheet material arranged in side-by-side relationship selectively to different levels, the apparatus comprising a first web feed table, a second web feed table downstream of said first feed table with respect to the direction of travel of webs through the apparatus, a third feed table above said second feed table and inclined upwardly with respect thereto, a plurality of guide members disposed in spaced relationship across the apparatus between the first feed table and the second and third feed tables, above or below the plane of the first feed table, and capable of movement to intersect said plane, a like number of fluid operated cylinders for moving said guide members individually thus to cause an advancing web to be directed selectively towards upper and lower

stations, and means for actuating each said cylinder to enable movement of the associated one of said guide members during travel past the guide members of a batch of webs and prior to the arrival of a next succeeding batch.

An embodiment of the invention will now be described by way of example only, with reference to the accompanying drawings, in which:—

Figure 1 is a schematic elevation of the apparatus disposed between a slitting machine and a rotary cutting machine;

Figure 2 is a plan view thereof; and

Figures 3a, 3b and 3c, are side elevations of the apparatus in three different operating conditions.

Referring now to the drawings there is shown a slitting machine 10 to which, in this example corrugated board is fed to be slit into a plurality of side-by-side parallel webs as required. The slit webs are subsequently fed via apparatus generally indicated at 11 to a rotary cutting machine 12 wherein two pairs 13 and 14 of rotary cutting knives are provided one in each of two vertically displaced stations in the machine.

The apparatus 11 comprises a first fixed feed table 20, a second fixed feed table 21 inclined downwardly from the output end of the table 20, and a third fixed feed table 22 inclined upwardly with respect to the feed tables 20 and 21. A plurality of spaced shoes 23 are provided in a line across the apparatus 11 between the feed tables 20 and 22. Each shoe 23 is mounted on a double-acting pneumatic cylinder 24 which acts vertically through one or more apertures in the feed table 21 to raise and lower the shoe 23 relative to the plane of travel of webs across the feed table 20. Each shoe 23 is radiused about a transverse horizontal axis to ensure smooth passage thereover of a web passing through the apparatus.

The shoes are therefore reciprocable between raised and lowered positions wherein they are thus arranged to direct advancing webs respec-

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tively to upper and lower stations defined by the feed tables 22 and 21.

A roller 25 is provided at the input end of the feed table 22 to prevent damage to the surface of any web travelling in contact with the end of the table 22.

A pneumatic supply circuit (not shown) is provided to drive the cylinders 24 via a number of solenoid operated valves, one for each cylinder. The valves are preferably arranged to be preset on a control panel by switch means and adapted to await a command signal initiating the actuation where appropriate, of the cylinders.

In use, as a number of discrete webs enter the feed table 20 from the slitting machine 10, the shoes 23 are actuated as appropriate to enable the webs to be directed selectively towards the two feed tables 21 and 22 for onwards transport into the two stations of the rotary cutting machine 12.

With reference to Figure 3a and considering operation of a single shoe, when it is required to direct an advancing web to the upper station the shoe is raised before the immediately preceding web has ceased moving across it; it being assumed for the sake of this example, that the immediately preceding web had been directed towards the lower station. Thus the next succeeding web is guided by the shoe 23 onto the feed table 22.

With reference to Figure 3c, it will be seen that until the preceding web has passed, the latter is constrained to travel over the raised shoe, the roller 25 serving to guide the web smoothly until it leaves the shoe 23 whereupon it falls onto the feed table 21.

With reference to Figure 3b before the trailing edge of an upwardly directed web approaches the shoe, and if the next succeeding web is to be directed towards the lower station then the shoe is lowered prior to the arrival of the leading edge of the next web so that the latter is permitted to fall freely onto the lower feed table 21.

Clearly it is necessary to ensure that all the shoes 23 which are aligned with any part of a web to be directed to the lower station, must be lowered and only those shoes which are wholly within the width of a web to be directed upwardly should be raised.

It will be appreciated that as actuation of the selected shoes is effected prior to the arrival of the leading edge of a batch of webs then, although the batches are fed to the apparatus successively with little or no gap between them, the webs are so directed automatically. The directing of webs to different levels has always created a problem when little or no gap is found between successive batches. Movement of the shoes is preferably effected just prior to the arrival of a next batch of webs but can be carried out almost at any time during passage of the previous batch through the apparatus. In this way no complex timing device is required

to determine the moment at which the shoes are moved.

Although the present description refers to a device for selectively directing moving webs to one of two stations, it is clear that by providing a further set of shoes downstream of the first set and at one or both of the two stations so far described, then it is possible to divert selected webs accordingly from said upper or lower station, to a further station or stations.

The operation of one or more sets of shoes by actuation of their associated solenoid valves and cylinders can be carried out fully automatically by, for example, computer controlled means, enabling batches of slit webs to be manoeuvred to two or more stations in accordance with a predetermined programme.

It is not intended to limit the invention to the above example only, many variations such as might readily occur to one skilled in the art being possible without departing from the scope of the invention as defined by the appended claims.

Thus for example, the shoes 23 can be replaced by rollers, and the shoes or rollers and associated cylinders 24 can be disposed above the plane of the feed table 20 acting downwardly as appropriate upon webs to be directed towards the lower station. In this case the feed table 22 is located closer to the feed table 20 and is disposed so that the webs would normally pass directly onto its surface unless otherwise directed by the downwardly acting shoes or rollers.

WHAT WE CLAIM IS:-

1. Web Feeding apparatus for directing a batch of webs of sheet material arranged in side-by-side relationship selectively to different levels, the apparatus comprising a first web feed table, a second web feed table downstream of said first feed table with respect to the direction of travel of webs through the apparatus, a third feed table above said second feed table and inclined upwardly with respect thereto, a plurality of guide members disposed in spaced relationship across the apparatus between the first feed table and the second and third feed tables, above or below the plane of the first feed table, and capable of movement to intersect said plane, a like number of fluid operated cylinders for moving said guide members individually thus to cause an advancing web to be directed selectively towards upper and lower stations, and means for actuating each said cylinder to enable movement of the associated one of said guide members during travel past the guide members of a batch of webs and prior to the arrival of a next succeeding batch.

2. Web feeding apparatus according to claim 1, wherein said guide members are disposed, in their lowered positions, below the plane of the first feed table.

3. Web feeding apparatus according to claim 2, wherein said guide members are adapted for elevation through one or more apertures in said second feed table.

4. Web feeding apparatus, according to any one of claims 1 to 3, wherein said actuating means comprises a number of solenoid operated valves connected to said fluid operated cylinders, and a common air supply system for said cylinders, said valves being operable selectively to actuate said cylinders thus to raise and lower said guide members as required.
5. Web feeding apparatus according to claim 4, wherein said solenoid operated valves are connected to a control panel having switch means therefore so arranged that the next required positions of said guide members can be preset by an operator prior to actuation.
6. Web feeding apparatus according to any one of the preceding claims, including one or more further sets of guide members downstream of said aforementioned set at one or both of said stations thus to enable webs already diverted to one station to be further diverted accordingly to a further station or stations.
7. Web feeding apparatus according to claim 1, wherein said guide members are disposed normally above said third feed table and adapted when lowered, to guide an advancing web onto said second feed table thus to deliver same to said lower station, and when raised to permit an advancing web to pass freely onto said third feed table.
8. Web feeding apparatus according to any one of the preceding claims, wherein said guide members are constituted by shoes having a guide surface which is curved about an axis transverse to the direction of travel of webs.
9. Web feeding apparatus according to any one of claims 1 to 7, wherein said guide members are constituted by rollers whose axes of rotation are transverse to the direction of travel of the webs.
10. Web feeding apparatus substantially as hereinbefore described, with reference to and as illustrated in the accompanying drawings.
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